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Indian Standard

AUTOMOTIVE VEHICLES — ELECTRICAL WINDSHIELD WASHING SYSTEMS — PERFORMANCE REQUIREMENTS

UDC 629.113.011.673.573 : 620.16

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BUREAU OF INDIAN STANDARDS
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Price Group 2

Automotive Electrical Equipment Sectional Committee, TED 11

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Electrical Equipment Sectional Committee had been approved by the Transport Engineering Division Council.

In order to provide a clear, direct vision to the driver under conditions such as dust, rain, snow, etc safety features such as wipers and washers are provided in all automotives. These two all weather systems, complementary to each other help maintain the windshields in proper condition. Windshields should be capable of withstanding many environmental stresses encountered by the vehicles. The washing system is essentially to provide a minimum spray of water or cleaning liquid on the windshield to enable wiping the screen clean of any deposits of dust, dirt, mud, snow, etc, without the driver having to necessarily move out of the vehicle to carry out the task.

While wiper systems and their components are covered by IS 7827 series of Indian Standards, this standard covers the 'Washers' (washing system) only.

For any additional environmental tests, reference may also be made to IS 10250 : 1982 'Severities for environmental tests for automotive electrical equipment'.

In the preparation of this standard assistance has been derived from JIS D 5704 : 1983 'Electric Windshield Washers for Automobiles' issued by Japanese Industrial Standards Committee.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960. This number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

AUTOMOTIVE VEHICLES — ELECTRICAL WINDSHIELD WASHING SYSTEMS — PERFORMANCE REQUIREMENTS

1 SCOPE

This standard specifies the various tests and their requirements for assessment of performance of electrically operated windshield washing systems (referred to hereafter as 'washers') used in all four and above wheeled vehicles.

2 REFERENCE

IS 10250 : 1982 Severities for environmental tests for automotive electrical equipment is a necessary adjunct to this standard.

3. TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Windshield Washer

It is a device which sprays the cleaning liquid to the automotive wind screen and includes a tank, washing liquid, hose, pump and motor, nozzle and control means.

3.2 Washer Pump

It is a device which generates pressure to spray the washing liquid and includes a motor.

3.3 Nozzle

The part which sprays the washing liquid in the form of a jet.

3.4 Hose

Tube which connects the nozzle and pump to deliver the washing liquid.

3.5 Washing Liquid

Water with hardness of 205 mg $CaCo_3$ or less per litre or an aqueous solution prepared by dissolving a prescribed additive in water.

3.6 Tank

The unit which stores washing liquid.

3.7 Cap

The lid which covers the tank inlet.

3.8 Target Area

The surface area of the windshield to be sprayed by the washing liquid from the tank through the nozzle.

3.9 Control

The switch which energizes or de-energizes the motor of the washer through the power source.

4 SYSTEM REQUIREMENTS

4.1 The system voltage for washers shall be 12 volts or 24 volts.

4.2 The test shall be carried out under normal condition 25±5°C at a relative humidity of 65±20 percent and with voltage as specified in Table 1.

Table 1 Voltage Requirements, Volts

Nominal voltage	12	24
Test voltage for washer	13.5±0.3	26±0.6
Durability test voltage	14±0.5	27±1

4.3 System Set-Up

The system shall be installed in line with the use on actual vehicle or directly on the test vehicle. The nozzle shall be positioned such that it points to the target area of the windshield.

5 GENERAL REQUIREMENTS

The construction and dimensions of the washer unless otherwise agreed to between the purchasers and the suppliers shall meet the following requirements.

5.1 The material of the tank, pump, hoses and nozzle shall be such that it retains its integrity when the washing liquid is 50 percent aqueous solution of methyl alcohol, *iso*propyl alcohol or ethylene glycol (for low temperature requirements).

5.2 The dimensions for supporting brackets of the tank to the chassis shall be mutually agreed between the manufacturer and the purchaser.

5.3 The capacity of the tank shall be from 0.8 to 2.5 litres unless otherwise specified by the purchaser or the manufacturer.

5.4 The hose pipe for delivering the washing liquid shall be a vinyl pipe of 4 mm of internal diameter unless otherwise specified, capable of withstanding resistance to temperature as per **6.3.3.**

5.5 The washer nozzle shall be fitted to the body and the dimensions and shape shall be mutually agreed between the purchaser and the manufacturer.

5.6 The electrical terminals of the washer shall be secured directly on the drive motor and dimensions shall be agreed between the purchaser and the manufacturer.

6 CLASSIFICATION OF TESTS

6.1 Type Tests

6.1.1 The following tests shall constitute the type tests:

a) Visual examination and dimensional check,
b) Operating voltage range test,
c) Discharge pressure test,
d) Leakage test,
e) Insulation resistance,
f) Resistance to temperature,
g) Vibration resistance,
h) Corrosion resistance,
j) Durability test,
k) Continuous operation test, and
m) Resistance to blockage.

6.1.2 Criteria for Approval

At least 9 samples shall be submitted for testing together with relevant data. These shall be tested according to the sequence of tests given in Table 2 for approval of the washer.

6.1.3 In case of failure of any type test the testing authority may call for improvement or fresh samples for re-test of the tests in whch failure occurred. The final results may be based on re-tests in which failure occurred. The final results may be mutually agreed between the manufacturer and the purchaser.

6.2 Acceptance Tests

6.2.1 Following tests shall constitute acceptance tests:

a) Visual examination,
b) High voltage test,
c) Operating voltage test,
d) Discharge pressure test,
e) Leakage test,
f) Insulation resistance test, and
g) Resistance to blockage test.

6.2.2 The sampling plan for acceptance tests shall be as agreed upon between the manufacturer and the purchaser.

6.2.3 Routine Tests

The following shall constitute the routine tests.

a) Visual examination,
b) Operating voltage test,
c) Discharge pressure test, and
d) Leakage test.

6.3 Visual Examination

6.3.1 The washers shall be examined for external finish, workmanship and marking.

Table 2 Sequence of Tests for Type Approval
(*Clause* 6.1.2)

Sequence of Tests		No. of Test Samples								
		1	2	3	4	5	6	7	8	9
a)	Visual examination	x	x	x	x	x	x	x	x	x
b)	Operating voltage range	x	x	x	x	x	x	x	x	x
c)	Resistance to temperature	x								
d)	Vibration resistance		x							
e)	Durability			x	x	x	x			
f)	Leakage test	x								
g)	Resistance to blockage	x								
h)	Insulation resistance							x		
j)	Corrosion resistance								x	
k)	Continuous operation test									x
m)	Discharge pressure	x	x	x	x	x	x			

6.3.2 *Operating Voltage Range*

The washer shall operate satisfactory over the following voltage range.

Rated Voltage V	*Performance, Max* V	*Limit for Voltage, Min* V
12	16	11
24	32	22

6.3.3 Resistance to Temperature

The washer shall be tested according to Table 3 with its tank filled with water, and after completing the Test 1, Table 3, shall be tested for tests f, g and h mentioned in Table 2 (*see* **6.3.7**, **6.3.8** and **6.3.9**).

Table 3 Resistance to Temperature Test

Test Criteria	Test Condition
Low Temperature Withstanding Test	The washer to be soaked at $-10\pm3^\circ$C for 4 h and while the water is in frozen state shall be operated with the switch, to spray 6 times per minute with the motor 'ON' for atleast 3 sec
Freeze/Defreeze Cycle Test	One cycle consists of freezing the water at $-10\pm3^\circ$C and warming the washer to room temperature to defreeze slowly. Repeat the cycle six times
High Temperature Test	The washer to be soaked at $93 \pm 3^\circ$C for 8 h

6.3.4 *Vibration Resistance*

The test shall be carried out as in accordance with 4.1 of IS 10250 : 1982. The washer after the test shall satisfy the leakage test (*see* **6.3.7**). The washer shall not be operated during the test.

6.3.5 *Durability Test*

The washer shall be tested with plain water in the tank in the normally installed condition. The test pattern to be followed shall be as per Table 4.

Table 4 Sequence for Durability Test

Test Sequence	Total No. of Cycles	Ambient Temp.
1	2 000	Room
2	2 000	$65\pm3^\circ$C
3	2 000	$0\pm3^\circ$C
4	2 000	Room

One cycle comprises of 3 seconds 'ON' and 27 seconds 'OFF' of the washer pump. The pump shall perform satisfactorily at all temperatures.

6.3.6 *Discharge Pressure*

The washer shall be capable of discharging atleast 100 ml of water for 10 seconds of operation at a discharge pressure of 0.9 kg/cm^2.

6.3.7 *Leakage Test*

When operated the washer shall spray without developing any leakage from the pump or hose joints. The spray shall not loose the hose joints.

6.3.8 *Resistance to Blockage*

With the washer tank full of water and the hoses or outlet of the pump blocked the washer is operated six times in one minute. The spray shall be sustained for a minimum of three seconds. The washer system shall function satisfactorily.

6.3.9 *Insulation Resistance Test*

When measured with 500 volts Megger for 60 seconds the insulation resistance of the drive motor shall be more than one megohm.

6.3.10 *Corrosion Resistance Test*

All metallic parts of the washer shall be plated such that when subjected to two cycles of salt spray of 24 h each with one hour suspension the system after the first cycle shall not show any sign of corrosion or electrolytic action.

6.3.11 *Continuous Operation Test*

When run continuously for 60 seconds minimum with full tank of water, the washer shall not show any failure or malfunction.

7 MARKING

The washers shall be provided with the following markings for information.

a) Manufacturer's name or trade-mark, if any;
b) Source of manufacture;
c) Rated voltage and polarity;
d) Month and year of manufacture or lot number, to trace back date of manufacture;
e) Identification of suction and discharge side of the washer; and
f) Capacity of tank in litres.

7.1 BIS Certification Marking

The product may also be marked with Standard Mark.

7.2. The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

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